

## **Javier de Luis, PhD**

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### **QUALIFICATIONS**

Over thirty years industry experience managing complex, technology projects and organizations. Excellent technical and management background. Proven strategic thinking, analysis, communication, and problem-solving skills, as well as leadership ability and commitment.

### **EDUCATION**

Doctor of Philosophy, Massachusetts Institute of Technology/Department of Aeronautics and Astronautics

Master of Science in Engineering and Management, Massachusetts Institute of Technology/School of Engineering and Sloan School of Management.

Master of Science, Massachusetts Institute of Technology/Department of Aeronautics and Astronautics

Bachelor of Science, Massachusetts Institute of Technology/Department of Aeronautics and Astronautics

### **ACADEMIC APPOINTMENTS**

2018 –pres. *Lecturer, MIT Dept. of Aeronautics and Astronautics*  
Instructor for the systems engineering teams for various capstone senior and graduate design classes. Fund-raised for the Zero Robotics STEM competition, an MIT-run contest for high school and middle school students using robots on the International Space Station. Have lectured on 737 Max crashes at a dozen companies and universities around the world.

1994 – 2017 *Research Affiliate, MIT Dept. of Aeronautics and Astronautics*  
Instructor for numerous classes and research programs, including the first Conceive, Design, Integrate, and Operate (CDIO) class. This class developed the SPHERES satellites, which were deployed on-board the International Space Station. Project Manager for MIT/Draper's Lunar/Mars Exploration Architecture program.

1992 – 1994 *Visiting Engineer, MIT Dept. of Aeronautics and Astronautics*  
Project Manager for the MODE and MACE programs on board the Space Shuttle.

### **EMPLOYMENT**

2015 –pres. *Consultant*  
Provide consulting and business development services to local aerospace companies and educational institutions. Focused on government contracting, product development, and strategy.

- 2007 -2015    *VP of R&D, Chief Scientist, Aurora Flight Sciences*  
Responsible for internal and external research and development activities for 500 person aerospace company. Grew externally funded R&D activities from \$3M to \$30M over last seven years. Reports directly to company president. Responsible for outreach activities in cooperation with MIT, Draper, and other organizations and universities. Project Manager on numerous additional NASA and DoD R&D projects.
- 2001-2007    *CEO and Chief Scientist, Payload Systems Inc.*  
Responsible for corporate strategy development and planning of 30-person spaceflight research and hardware development company. Provided technical direction and expertise for all company projects. Project Manager for major NASA hardware development project (Cell Culture Unit). Guided project through major replanning and rescoping activities due to NASA budget and requirement changes. Project Manager (30 staff and students) for MIT Concept Exploration and Refinement program for the NASA Exploration Systems Division, responsible for technical direction, financial management, and customer reporting. Technical lead on numerous additional NASA and DoD R&D projects.
- 1989-2001    *President and Staff Scientist, Payload Systems Inc.*  
Project manager and/or engineering lead for over a dozen NASA technology, spaceflight development, and aerospace programs. All payloads were flown successfully and all mission objectives were achieved. At the corporate level, responsible for financial management and oversight; personnel hiring, evaluation, and termination; business development and client relations. Appeared on several local news programs as commentator during Shuttle missions. Astronaut candidate finalist, 1989, 1998, 2000. Numerous NASA awards, including Group Achievement Award.
- 1989-1989    *Researcher Associate, Mass. Inst. Of Tech.*  
Responsible for the definition of test articles for two spaceflight experiments. Supervised graduate students conducting laboratory experiments using prototype intelligent structure.

## **AWARDS**

AIAA New England Aerospace Engineer of the Year, 2002  
NASA Certificate of Appreciation for the Middeck Active Control Experiment (MACE), 1997  
NASA Manned Flight Awareness Award for Dynamic Load Sensor Experiment  
NASA Group Achievement Award for the Middeck 0-Gravity Dynamics Experiment  
OAST "Commendation for Technology Excellence" for the Middeck 0-Gravity Dynamics Experiment.  
NASA First to Fly award for the successful flight of the MODE precursor mission

(MODE-0) on-board STS-40. This experiment was conceived, manifested, and carried out in under three months.

Finalist, 1989, 1998, 2000 NASA Astronaut Candidate Selection Program.

Received United States patent #4849668 for the development of technique to electrically insulate embedded piezoelectrics from surrounding laminated structure while maintaining actuator and sensor effectiveness.

Received United States patents #7838716 and #8395010 for a high speed swelling hemostatic device that functions as an internal tourniquet to apply pressure on wound cavities to stop or restrict the flow of blood

Received United States patent #7980024 for a photobioreactor system positioned on bodies of water such as a pond or a lake.

MIT James Means Memorial Prize for excellence in space systems engineering for work performed in the design of a meteor protection system for a manned space station.

Authored seminal paper in the field of Smart Materials, "Use of Piezoelectric Actuators as Elements of Intelligent Structures", which has been referenced over 3500 times (as of Apr-2022) by subsequent journal and conference publications.

#### **APPOINTMENTS AND COMMITTEES**

FAA Changed Product Rule (CPR) Aviation Rulemaking Committee, 2024 - pres

FAA Organization Designation Authorization (ODA) Expert Panel, 2023 – 2024

NASA Advisory Subcommittee on Technology and Commercialization, 1999 to 2003

Staff, NASA Space Station Subcommittee on Micrometeor and Debris Protection, 1991

Staff, NASA Space Station Subcommittee on ISS External Environment, 1993

#### **PERSONAL**

Born in Mexico. Naturalized U.S. citizen as of 1976. Attended secondary school in Lausanne, Switzerland. Speak and write three foreign languages fluently (Spanish, French, Portuguese).

Interests include flying (private pilot VFR license), downhill skiing, scuba diving (PADI advanced open water certificate, 200+ open water dives, including cave, night, and deep dives), photography, international relations, history, and law.

Member, AIAA, AOPA, Tau Beta Pi, Sigma Gamma Tau, Sigma Xi.

**SELECTED PUBLICATIONS**

Velmahos GC, Tabbara M, Spaniolas K, Duggan M, Alam HB, Serra M, Sun L, de Luis J. "Self-expanding hemostatic polymer for control of exsanguinating extremity bleeding". J Trauma, 2009; 66:984-8.

Vunjak-Novakovic, G., Searby, N., de Luis, J, Freed, Lisa E, "Microgravity Studies of Cells and Tissues," Invited Paper, *Ann. N.Y. Acad. Sci.* 974: 504-517 (2002).

Kundakovic Lj., Pretorius S., Sun L., Larenas P., Rask J., Searby N., de Luis J., Vanderiesche D. and Vunjak-Novakovic G. Myoblast differentiation under flow conditions. NASA Cell Science Conference, February 20-22, 2003, Houston TX.

3. Sun L., Pretorius S., Lagaz J., Preda C., Donovan F., Searby N., Havens C., Vanderiesche D., de Luis J., Parish J. and Vunjak-Novakovic G. Ground base studies of *Saccharomyces cerevisiae* yeast growth in the Cell Culture Unit. NASA Cell Science Conference, February 20-22, 2003, Houston TX.

Vunjak-Novakovic, G., Searby, N., de Luis, J., Freed, Lisa E., "Microgravity Studies of Cells and Tissues," *Ann. N.Y. Acad. Sci.* 974: 1-14 (2002)

Miller, D. W., de Luis, J., "Using the Shuttle, MIR and ISS for Operating Micro-Gravity Engineering Research Laboratories," Proceedings of the AIAA Space 2001 Conference & Exposition, AIAA 2001-4648, Albuquerque, NM, August, 2001.

de Luis, J., Vunjak-Novakovic, G., Searby, N., "Design and Testing of the ISS Cell Culture Unit," IAF/IAA-00-G.4.06, presented at the 51<sup>st</sup> International Astronautical Congress, Rio de Janeiro, Brazil, Oct. 2000.

Cho, S., de Luis, J., Bokhour, E., Sullivan, J., Poulin, L., "International Space Station and Shuttle Experiment Support Facility for Structures and Control," Air Force Research Laboratory, Kirtland Air Force Base, NM 87117, AFRL-VS-TR-2000-1005, 1/2000.

Searby, N.D., de Luis, J., Vunjak-Novakovic, G. (1998) "Design and Development of a Space Station Cell Culture Unit," 1998 Transactions, Vol. 107, Journal of Aerospace, Section 1, pages 445-457.

Vunjak-Novakovic, G., Preda, C., Bordonaro, J. Pellis, N., de Luis, J., Freed, L.E., "Microgravity Studies on Cells and Tissues: From Mir to the ISS," Space Technology and Applications, International Forum (STAIF-99), Albuquerque NM, January 1999. Published by the American Institute of Physics, pp 442-452, 1999

Freed, L.E., Pellis, N., Searby, N., de Luis, J., Preda, C., Bordonaro, J., Vunjak-Novakovic, G., "Microgravity Cultivation of Cells and Tissues," Gravitational Space and Biology Bulletin, Proceedings of the Am. Soc. for Space and Grav. Biol., October 1998.

Peterson, Lake and de Luis, "Micron Accuracy Deployment Experiments (MADE): A Space Station Facility for Validating Precision Deployment and Active Controls," Presented at the NGST Technology Challenge Workshop, Oxnard, California, 6/98.

Searby, N.D., de Luis, J., Vunjak-Novakovic, G. (1998) "Design and Development of a Space Station Cell Culture Unit," SAE Technical Paper Series 981604, 28th International Conference on Environmental Systems, Danvers, MA, July 13 - 16, 1998, pp. 1 - 14.

Jacques, R.N., Miller, D.W., de Luis, J., "Typical Section Problems for Structural Control Applications," *Journal of Intelligent Material Systems and Structures*, Vol. 7, Nov. 1996.

Sloot, E.A., Jacobs, J.K., van Ravenzwaaij, J., de Luis, J., "The Canadian Float Zone Furnace - A Multi-User Microgravity Facility for Materials Purification and Crystal Growth," submitted to the 43rd International Astronautical Federation Congress, Austria, 1993.

Hoskins, W., Klynn, L., Miller, D.W., de Luis, J., "The MACE Active Member," Proc. of the Adaptive Structures, Actuators, and Material Conference, Alexandria, VA, Nov. 1991

STS-48 L-30 and L-2 Press Conferences. Represented payload organization at NASA pre-mission press conferences.

Jacques, R.N., Miller, D.W., de Luis, J., "Typical Section Problems for Structural Control Applications," accepted to the AIAA *Journal of Guidance, Control and Dynamics*, Oct. 1991.

Crawley, E.F., Miller, D.W., de Luis, J., "The MODE Family of On-Orbit Experiment: The Middeck Active Control Experiment," annotated viewgraphs for the 1990 CSI Conference, Orlando, FL Nov. 1990.

Miller, D.W., de Luis, J., Crawley, E.F., "Dynamics and Control of Multipayload Platforms: The Middeck Active Control Experiment (MACE)," presented at the 41st International Astronautical Federation Congress, Dresden, GDR, Oct 1990.

de Luis, J., Crawley, E.F., "Active Control Experimental Results on a Prototype Intelligent Structure," presented at the 31st AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conf., Long Beach, Ca. April 1990.

Crawley, E.F., Miller, D.W., van Schoor, M., de Luis, J., "Middeck 0-Gravity Dynamics Experiment (MODE) Project Plan," M.I.T. Space Systems Laboratory Report, #9-89, July 1989.

Crawley, E.F., de Luis, J., Miller, D.W., "Middeck Active Control Experiment (MACE): Phase A Final Report," M.I.T. Space Systems Laboratory Report, #7-89, June 1989.

de Luis, J., Crawley, E.F., Hall, S.R., "Design and Implementation of Optimal Controllers for Intelligent Structures Using Infinite Order Structural Models," M.I.T. Space Systems Laboratory Report, #3-89, February 1989.

Crawley, E.F., de Luis, J., Hagood, N.W., Anderson, E.H., "Development of Piezoelectric Technology for Applications in Control of Intelligent Structures," presented at the 1988 American Control Conference, Atlanta, Ga. June 1988.

Crawley, E.F., de Luis, J., "Use of Piezoelectric Actuators as Elements of Intelligent Structures," *AIAA Journal*, Vol. 25, No. 10, October 1987, pp. 1373-1385

Crawley, E.F., de Luis, J., "Experimental Verification of Distributed Piezoelectric Actuators for use in Precision Space Structures," AIAA paper 86-0878-CP, presented at the 27th AIAA/ASME/ASCE/ AHS Structures, Structural Dynamics and Materials Conference, San Antonio, Tx. May 1986.

de Luis, J., Crawley, E.F., "The Use of Piezo-Ceramics as Distributed Actuators in Flexible Space Structures," M.I.T. Space Systems Laboratory Report, #20-85, 1985.

Crawley, E.F., de Luis, J., "Use of Piezo-Ceramics as Distributed Actuators in Large Space Structures," AIAA paper 85-0626-CP, presented at the 26th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conference, Orlando, Fl., April 1985.